

We claim:

1. A rapid deployment system comprising an aircraft, at least one [inflatable landing] tube coupled to the aircraft, the at least one landing tube comprising an inner surface, an outer surface, a top end and an open bottom end, an inflatable exit slide positioned at the open bottom end of the landing tube, an air source connected to the landing tube and the exit slide for inflating the landing tube and the slide to an optimum pressure, [and plural connectors positioned on the landing tube for coupling the landing tube to the aircraft] [at least one entry port leading into the landing tube] and plural flexible retarders extending inward from the inner surface of the landing tube for retarding gravitational descent of cargo and/or personnel from the aircraft.

2. The system of claim 1, wherein the landing tube comprises multiple tubular segments connected to each other to form a continuous descent tube. Abstract

3. The system of claim 1, wherein the connectors are selected from the group consisting of bolts, adhesives, pitons and drilled holes filled with solidifying compounds.

4. The system of claim 1, wherein the landing tube is connected to an exit port of the aircraft, and wherein the at least one entry port of the landing tube is proximal the exit port of the aircraft.

5. The system of claim 4, wherein the landing tube is free-flowing and detachable from the aircraft.

6. The system of claim 1, further comprising a spine along the landing tube, the spine being retractable telescopically allowing for the landing tube to be retracted within the aircraft for storing and deployment as needed.

7. The system of claim 4, wherein the landing tube is connected to exterior edges of the exit port of the aircraft, and wherein the entry port further comprises a window coaming adapter positioned around the exterior edges and a membrane carried by and extending between sides of the adapter, and wherein the membrane expands with the landing tube as the landing tube is inflated.

8. The system of claim 7, wherein the membrane comprises multiple layers and expansion cells between adjacent layers for allowing independent expansion of the layers.

9. The system of claim 4, wherein the exit port of the aircraft is selected from a group consisting of cargo openings, personnel exits, passenger exits, and combinations thereof.

10. The system of claim 7, wherein the entry port of the landing tube has a first shield positioned behind the membrane and connected to the aircraft for protecting the membrane, the shield having a first arm and a second arm, the arms lying in a straight line when the landing tube is inactivated and separating and swinging outward from each other when the landing tube is activated.

11. The system of claim 10, further comprising a second shield extending between edges of the exit port such that the

membrane is sandwiched between the first shield and the second shield.

12. The system of claim 10, further comprising an override lock positioned on the first shield to prevent the first shield from opening automatically.

13. The system of claim 7, further comprising ribs positioned in the middle layer of the membrane to assist in expansion of the membrane and to provide form and rigidity to the membrane once the system is deployed, and wherein the ribs are flexible in a horizontal plane and rigid in a vertical plane.

14. The system of claim 13, further comprising reinforced panels connected to the ribs for vertically linking the ribs.

15. The system of claim 13, further comprising wall channels positioned in the exit port for holding the membrane and the ribs.

16. The system of claim 13, further comprising spring loaded ratchet lock mechanisms positioned near the ribs, and wherein each rib has a joint at a center of the rib and a locking groove for catching the spring loaded ratchet lock mechanisms.

17. The system of claim 13, wherein the landing tube, the membrane and the ribs have shaped cross-sections when fully inflated.

18. The system of claim 1, wherein the flexible retarders extend inward from the inner surface of the landing tube and are positioned such that those descending remain along a central

region of the landing tube and such that the descent has reducing velocities.

19. The system of claim 18, wherein the flexible retarders comprise diverting slopes on a first side of the landing tube, bouncing bulges on a second side of the landing tube which is opposite the first side, cushions extending along sides of the landing tube between the bouncing bulges and diverting slopes, and friction assistors on the cushions.

20. The system of claim 19, wherein the diverting slopes and the bouncing bulges alternate from a front wall of the landing tube to a back wall of the landing tube along entire lengths of the landing tube.

21. The system of claim 19, further comprising flapper valves on the flexible retarders for absorbing excess energy of those descending and for discharging air from the structures.

22. The system of claim 19, wherein the diverting slopes comprise deflector ramps connected to the landing tube and deflector curtains extending from the deflector ramps.

23. The system of claim 1, further comprising a release bar extending from the tube at the entry port to facilitate entry into the inflated tube.

24. The system of claim 19, wherein the bouncing bulges connected to inner surfaces of the tube comprise an inflated safety core and friction points extending from the core.

25. The system of claim 19, wherein the friction assistors have multiple breakaway cushion quills, and wherein each cushion

quill further comprises a friction strand, an inflated cushion connected to the strand, and a breakaway retention and inflation point connected to the inflated cushion.

26. The system of claim 1, wherein the exit slide comprises an inflatable exit ramp.

27. The system of claim 26, further comprising an inflated pendulum barrier extending from the bottom end of the tube toward the exit ramp.

28. The system of claim 1, wherein the exit ramp comprises interconnected front and rear sections to provide flexibility when landing in rough terrain.

29. The system of claim 6, wherein the spine comprises stiffener extruding spine sections inside the landing tube with inflatable stabilizing winglets on exterior sides of the landing tube to provide stability during deployment at speeds.

30. The system of claim 29, wherein the stiffener extruding spine sections are telescopically disposed.

31. The system of claim 30, further comprising a storage container on the aircraft for storing the spines.

32. The system of claim 30, further comprising powered rollers and coupled belts engaging outer surfaces of the sections of the spines for telescopically retracting the spines.

33. The system of claim 30, wherein the spine sections are deployable by gravity within the landing tube.

34. The system of claim 33, further comprising drivers for deploying the spine sections.

35. The system of claim 34, wherein the drivers are pneumatic or hydraulic pressure drivers.

36. The system of claim 35, wherein the pneumatic pressure driver comprises rapidly combusting gases.

37. The system of claim 30, wherein the spine sections comprise plural segments in decreasing diameter.

38. The system of claim 30, further comprising a flexible hinge on the spine at the bottom end of the tube for connecting the spine and the exit slide.

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39. The system of claim 1, further comprising slide smocks for covering the cargo and/or the personnel to reduce possibility of snags during descent.

40. The system of claim 39, wherein the slide smocks line the inner surface of the tube for easy sliding during descent.

41. The system of claim 39, wherein the slide smocks are of friction reducing material removable as desired.

42. The system of claim 1, wherein the air source is a gas generator having a monopropellant generator, a control unit connected to the monopropellant generator for controlling the generator, an automatic valve connected to the monopropellant generator and to the tube, and a temporary expanding pressure device connected to the automatic valve.

43. The system of claim 18, wherein the flexible retarders are removably attached to the inner surface of the landing tube.

44. The system of claim 1, further comprising a shield on the landing tube.

45. The system of claim 44, wherein the shield is a Kevlar shield.

46. The system of claim 45, wherein the Kevlar shield is an exterior armor on a front portion of landing tube.

47. The system of claim 45, wherein the Kevlar shield is an exterior armor surrounding the landing tube.

48. A method for rapid deployment from aircraft comprising installing a tube having internal flexible retarders and exit ramps on an aircraft, activating gas generators connected to the tube, inflating the tube, the internal flexible retarders and the exit ramps with gas delivered from the activated gas generators, entering the tube through an exit port in the aircraft communicating with an entry port in the tube, deploying down the tube, impacting the internal flexible retarders extending inward from an inner surface of the tube, exiting the tube, sliding down the exit ramp, and landing ready for combat from the tube.

49. The method of claim 48, wherein installing the tube includes installing the tube along an opening of the aircraft.

50. The method of claim 49, wherein the deploying comprises deploying cargo.

51. The method of claim 48, wherein the deploying comprises deploying troops.

52. The method of claim 48, wherein the impacting comprises impacting systematically on the flexible retarders and wherein the landing comprises landing upright from the tube.